

CALEC® ST II



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1 Safety

1.1 Intended use

CALEC® ST II is a high precision instrument designed for the collection, analysis, presentation and transmission of information. Improper or non-intended use of the device may compromise operational safety. We accept no liability for any resulting damages.

1.2 Notes on safety instructions and symbols

The device has been designed to fulfil modern safety requirements. It has been tested and delivered in a condition that ensures safe operation. However, improper or non-intended use of the device may result in it becoming dangerous. Please always pay attention to the safety instructions in this manual which are accompanied by the following symbols:

WARNING!



WARNING indicates an action or measure which, if performed incorrectly, can cause potentially life-threatening injuries and lead to a high safety risk. Always follow the instructions and proceed with caution.

CAUTION!



CAUTION indicates an action or measure which, if performed incorrectly, can cause minor injuries and/or incorrect operation or destruction of the device. Always follow the instructions.

NOTE!



NOTE indicates an action or measure which, if performed incorrectly, may have an indirect effect on the operation of the device, or trigger an unexpected response.

COMMENT!



COMMENT provides information and recommendations for efficient and trouble-free operation.

REFERENCE!



REFERENCE refers to additional documents.

1.3 Installation, startup and operation

General hazards and warnings

WARNING!



Danger of electrocution!

Touching or gripping live electrical parts can cause an electric shock, which may result in burns, paralysis or death.

- The device should only be opened, installed or repaired when the power has been switched off.
- Only specialist technicians are authorised to work on or with mains voltage. They must comply with the applicable regulations.
- Only the intended terminals should be used to connect the device to the mains supply.

This device is intended for permanent installation with a fixed electrical connection. The installation, connection to the electricity supply, startup and maintenance must be carried out by trained, qualified personnel who are authorised to perform this type of work. The respective specialist personnel must have read and understood this installation and operation manual, and follow the instructions contained therein. The operator must ensure that the measuring system is wired correctly in accordance with the wiring diagrams. Contact protection is deactivated when the cover is removed (risk of electric shock). The housing may only be opened by qualified personnel.

Disconnect the power supply prior to electrical installation, and ensure that it cannot be reconnected without your consent.

Pay attention to the following points during installation:

- Voltage, operating data
- Maximum transmission length
- Cable cross-section and length
- Ambient temperature and installation position

1.4 Technical progress

We reserve the right to modify the technical specifications without prior notice.

REFERENCE!



Latest version of this manual!

The latest version of this manual is available at:
<http://www.aquametro.ch/qr/prod/calec-st/11111.html>



2 Structure of a measuring point

A complete measuring point for thermal energy consists of the CALEC® ST II energy calculator, paired temperature sensors and flow sensor.

NOTE!



Type of temperature sensor, pulse value, installation side!

Check whether the temperature sensor type (e.g. Pt100), pulse value and installation side (cold, hot) of the flow sensor match the nameplate on the CALEC® ST II.

NOTE!



Calibrated device!

Depending on the version, the CALEC® ST II is a calibrated measuring device (see calibration markings on the nameplate).

Calibration is rendered invalid if any changes are made to the calibration parameters.

The parameters can only be accessed once the verification seal has been destroyed.

Parameters related to the calibration of calibrated devices can only be adjusted by the manufacturer or by a designated calibration centre. The commissioning of a calibrated measuring point must be made by an authorized organisation according to the valid regulations.

After commissioning of the meter, the components (the calculator, the flow meter and two temperature sensors) must be sealed.

The applicable regulations and recommendations for installation and operation must also be complied with, e.g. Section 6 of EN 1434, and the recommendations of professional associations such as the „Merkblätter der Fernwärmeversorgung“ [fact sheets for district heating] issued by the German Energy Efficiency Association for District Heating, Cooling and CHP (AGFW). The installation of control immersion sleeves is mandatory in some countries (e.g. in France after FDE 39-007).

3 Scope of delivery, installation accessories

NOTE!

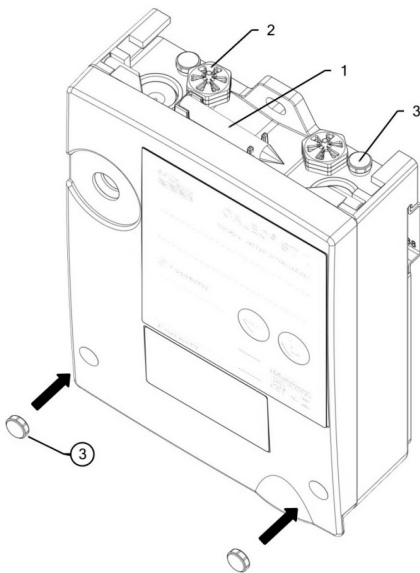


Calibrated device!

The unit can be damaged if not stored correctly!

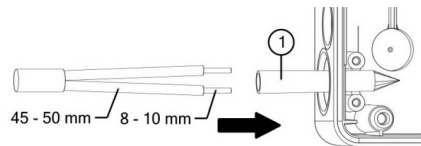
This precision measuring device can be damaged by heat, moisture, dirt and vibration, which can cause malfunctions.

The device must be stored in accordance with the specifications and only removed from the packaging immediately prior to installation.

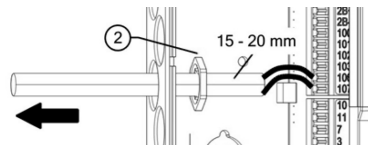


The supplied assembly and connection accessories are located on the top of the housing:

The yellow piercing awl 1) can be used to pass the cables through the membrane seals easily



The strain on the wire can be eased using the white strain-relieving discs 2).



The two red plugs 3) are used to secure the two screws in the front cover.

Unauthorised opening of the device can be detected if these safety caps have been installed.

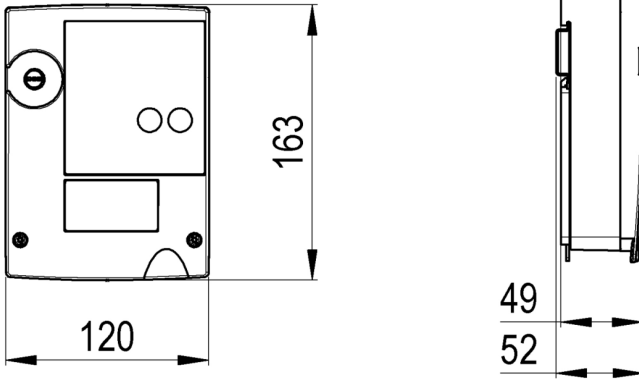
Removing the protective caps:

Pierce with a sharp tool and lever them out. This damages the cap, which needs to be replaced.

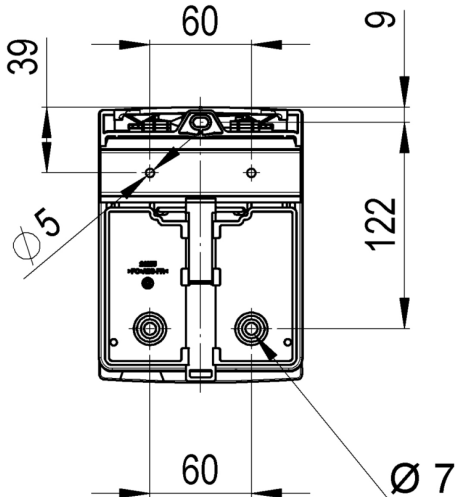
4 Installation

The CALEC® ST II can be mounted on a mounting rail or on a flat wall. Suitable mounting rails are available as an accessory (article number 19838). Please refer to the last page of this document for a hole template for both installation types.

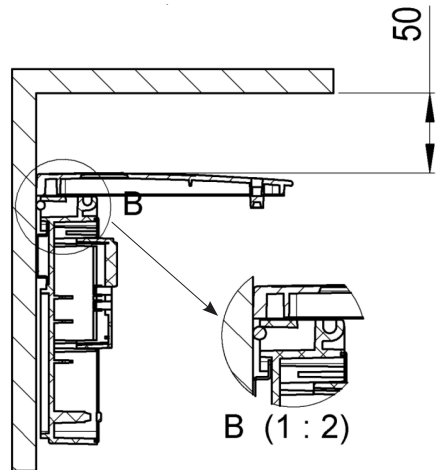
Device dimensions



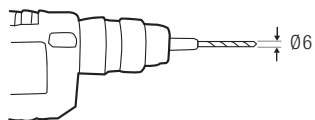
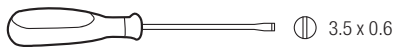
Hole dimensions for wall mounting



Clear height (for clipping on the housing cover)



Tools, assembly materials



3 x ∅4



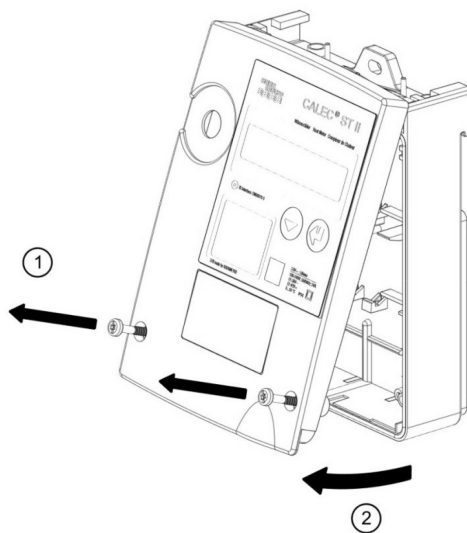
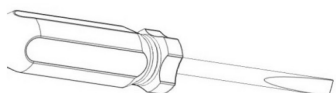
3 x ∅6



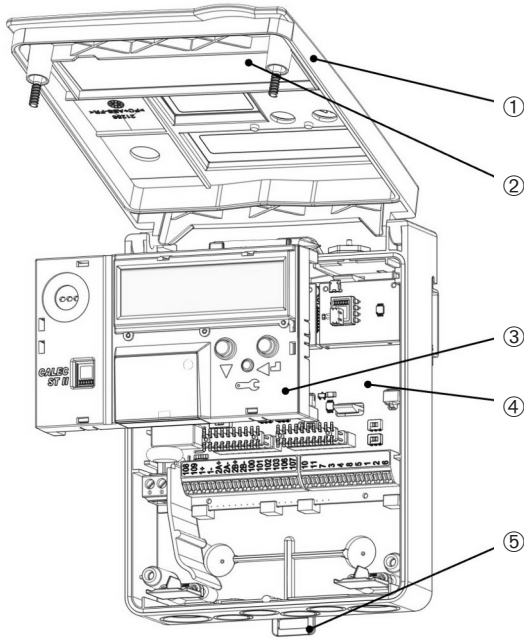
3 x 4.3 x 12

(Not included in the scope of delivery)

Opening the housing



Unit design



- ① The front cover can be locked into the lower section of the housing
- ② The connection diagram is located on the inside of the front cover
- ③ The motherboard can be accessed by removing the plug-in totaliser
- ④ Motherboard with terminals and microswitches for configuring inputs and outputs
- ⑤ Clip-on holder for mounting rail

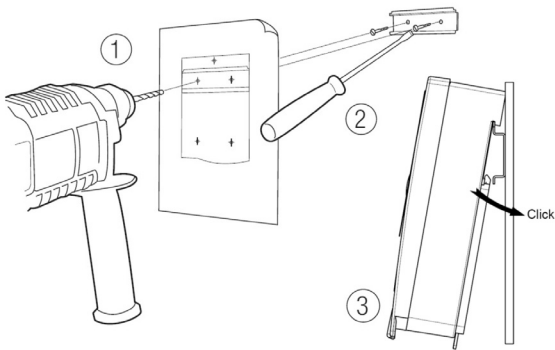
4.1 Installation

Installation instructions

Select the installation point:

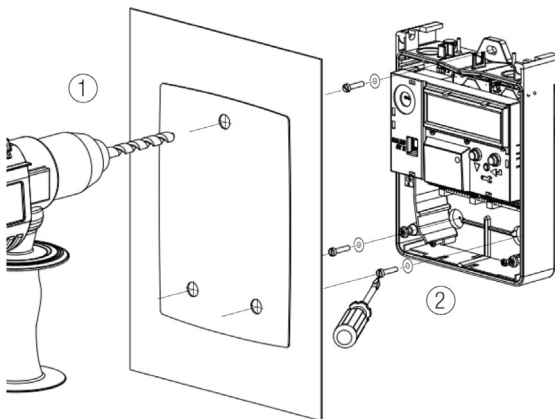
- protected from moisture, heat, direct sunlight and damage
- easily accessible for reading, operation and installation
- at a sufficient distance from sources of electromagnetic interference

Mounting on rail DIN-EN 50222



- ① Drill holes $\varnothing 6$
- ② Screw in the mounting rail
- ③ Clip the device onto the mounting rail

Wall mounting



Only mount the device on a flat surface!

- ① Drill holes $\varnothing 6$
- ② Screw in the device

4.2 Electrical connection

Hazard warning

WARNING!



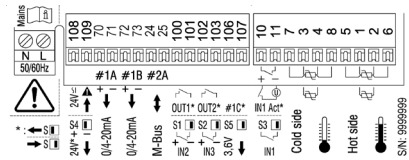
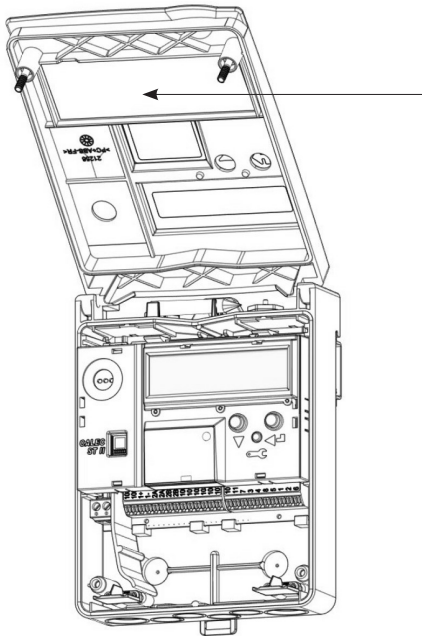
Danger of electrocution!

Touching or gripping live electrical parts can cause an electric shock, which may result in burns, paralysis or death.

- The device should only be opened, installed or repaired when the power has been switched off.
- Only specialist technicians are authorised to work on or with mains voltage. They must comply with the applicable regulations.
- Only the screw-type terminals in the separated area on the left in the terminal compartment should be used to connect the device to the mains supply.

Connection diagram

The connection diagram is located on the inside of the front cover.



Sample connection diagram:

Analogue outputs in socket #1 and M-Bus in socket #2.

Terminal technology

The CALEC® ST II is equipped with direct plug-in terminal connectors based on the “push-in” principle. Stripped rigid conductors or flexible conductors with crimped ferrules (AEH) can be plugged directly into the spring terminal to create a reliable, vibration-resistant and gas-tight connection. The release button has to be pressed for fine-stranded conductors, or to release the conductors.

Connectable conductors:

Single-conductor connection:

- Single-wire mm²: 0.50...1.50
- Finely stranded mm²: 0.50...1.50
- Finely stranded with AEH mm²: 0.25...1.50
- AEH with plastic collar mm²: 0.25...0.75

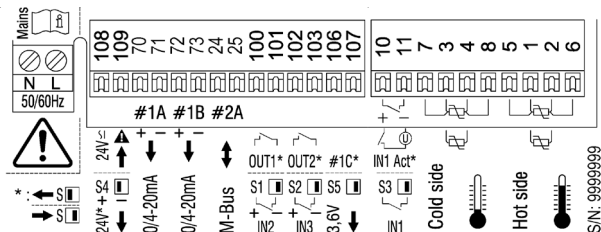
Stripping length mm: 8.0 + 1.0

AWG: 24-16

Functionality of connections

Connection diagram

The functionality of different connections can be configured with microswitches S1 - S5. The original factory status is documented on the connection diagram. If required, the alternative functionality shown in the connection diagram can be made available by switching the corresponding microswitch.



Sample connection diagram:
Analogue outputs in socket #1
and M-Bus in socket #2.

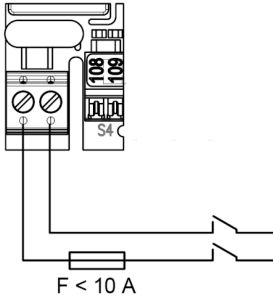
Overview of configuration options using microswitches

Terminals	Switch	Left function position * : ← S	Right function position → S
100 - 101	S1	OUTPUT#1	INPUT#2
102 - 103	S2	OUTPUT#2	INPUT#3
10 - 11	S3	INPUT#1: Active transmitter signal (5 - 48 VDC)	INPUT#1: Passive transmitter signal (e.g. reed)
108 - 109	S4	Sensor supply voltage	Note: Consider section low voltage supply (page 13)
106 - 107	S5	OUTPUT #1C	Sensor supply voltage 3.6 V DC

Supply voltage 100 - 240 V AC 50/60 Hz

- Connections: L and N

The supply voltage is connected via the two screw terminals in accordance with on-site regulations.



The cable is passed through the diaphragm seal using the enclosed piercing awl.

Voltage range: 100 - 240 V AC
 Frequency range: 50/60 Hz
 Power requirements: max. 15 VA

Connection cross-section: max. 2.5 mm²
 Cladding diameter: max. 8 mm
 Heat resistance: min. 65°C

100 - 240 VAC
50 / 60 Hz

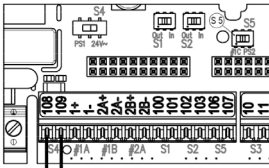


Connection to circuit with protection of max. 10A and double-pole isolating element.

Low voltage supply 12 - 42 V DC or 12 - 36 V AC 50/60 Hz or 24 VDC ± 20%

- Connections: 108 and 109

Switch S4 → S \square (24 V ~)



Low voltage supply

The CALEC® ST II can be supplied with safe extra-low voltage via these terminals.

Voltage range: 12 - 42V DC / 12 - 36V AC
 Frequency range: 50/60 Hz
 Power requirements: max. 1 VA

With adapter « insulated supply 24V-24V» (Art. no. 80828))

Voltage range: 24VDC ± 20%
 Frequency range: 50/60 Hz
 Performance range: max 1 W

NOTE!




In low voltage applications of CALEC® ST II, in which a multiple grounding (PE) exists in field installation, the adapter "insulated supply 24V-24V» (Art. no. 80828) must be positioned upstream.

Examples for grounding:

- Grounded pulse input (e.g. pulser AMFLO® MAG Basic)
- Grounded sensor supply 3.6V and / or 24V
- Grounded pole of the low voltage supply

Procedure:

1. Disconnect CALEC® ST II from power supply
2. Set switch S4 from left to right → 
3. Connect adapter:
 - 108+ from adapter to clamp 108 on CALEC® ST II
 - 109- from adapter to clamp 109 on CALEC® ST II
 - IN+ and IN- from adapter to the external measuring point supply

Additionally the low voltage and sensor supply is possible with the adapter "insulated supply 24V-24V». Therefore the sensor shall be connected with OUT2+ and OUT2- (max. 150 mA).

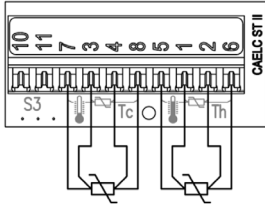


If the switch is not correctly set, the device is later may not working properly or getting destroyed.

The function low voltage supply shall only be used with the switch S4 in the position "right"!

4-wire temperature sensor

- Connections: 1 to 8



Check that the temperature sensor type (e.g. Pt500) corresponds to the specifications of the CALEC® ST II.

Connection cross-sections: min. 0.22 mm²
 Cable length: max. 100 m

NOTE!



Please check the connections carefully and ensure that the sensors are not reversed.

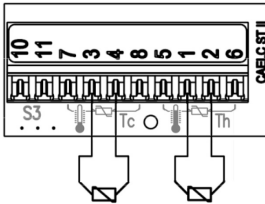
T_{hot} terminals 1/5 and 2/6

T_{cold} terminals 3/7 and 4/8

Temperature sensor cables must not be routed near power lines or electromagnetic interference sources (min. 50 cm distance).

2-wire temperature sensor

- Connections: 1, 2 and 3, 4



Check that the temperature sensor type (e.g. Pt500) corresponds to the specifications of the CALEC® ST II.

Connection cross-sections:
 Head sensor: min. 0.8 mm²
 Cable sensor: min. 0.22 mm²
 Cable length: shorter than 50 m (recommended)

Please note that the following maximum cable lengths are permitted for 2-wire technology, according to EN 1434-2:

Cable cross-section:	Cable length:	
	Pt100	Pt500
min. 0.22 mm ²	2.5 m	12.5 m
min. 0.50 mm ²	5.0 m	25.0 m
min. 0.75 mm ²	7.5 m	37.5 m
min. 1.5 mm ²	15.0 m	75.0 m

NOTE!



The length of signal cable supplied by the manufacturer must not be changed.

Please check the connections carefully and ensure that the sensors are not reversed.

T_{hot} terminals 1 and 2

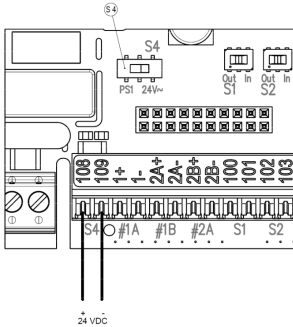
T_{cold} terminals 3 and 4

Temperature sensor cables must not be routed near power lines or electromagnetic interference sources (min. 50 cm distance).

Sensor supply voltage 24 V DC

- Connections: 108 and 109

Switch S4 * : ← S (PS1)



When switch S4 is in the left-hand position (PS1), terminals 108/109 have a 24 V DC power supply for supplying a flow transmitter, e.g. AMFLO® MAG Smart.

Output voltage: 24 VDC, electrically isolated from all other outputs
 Load: max. 150 mA
 Electrical isolation: max. 48 VDC

NOTE!



When the sensor power supply is not needed, it can also be used for the active supply of the current outputs (optional). If multiple current outputs are supplied, please note that these are no longer electrically isolated from each other.

Sensor supply voltage 3.6 V DC

- Connections: 106 and 107

Switch S5 → S (PS2)



When switch S5 is in the right-hand position (PS1), terminals 106/107 have a 3.6 V DC power supply for supplying a flow transmitter, e.g. AMFLO® SONIC UFA113.

Output voltage: 3.6 VDC, not electrically isolated
 Load: max. 2 mA

NOTE!

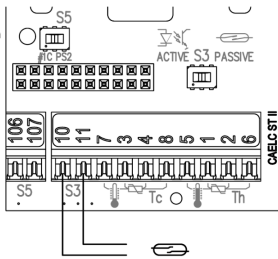


Terminal 107 is connected to terminal 11 and establishes the reference potential for the flow transmitter.

Flow transmitter with passive signal on pulse input #1

- Connections: 10 and 11

Switch S3 → S (PASSIVE)



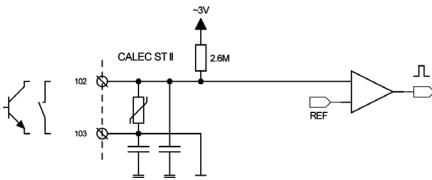
When switch S3 is set to the right-hand position (PASSIVE), a flow transmitter with passive pulse signals, such as a reed relay or SSR (solid state relay), can be connected to terminals 10 and 11.

The pulse signal from the flow transmitter must comply with the following specifications:

Open-circuit voltage:	8 V	
Short-circuit current:	8 mA	
Switching level:	<1.5 mA, >2.1 mA	
Input capacity:	20 nF	
Frequency range:	0...20 Hz	0...200 Hz
Min. OFF (toff):	20 ms	2 ms
Min. ON (ton):	3 ms	300 μs

The programming options for this input are described in the “InPutS” of chapter „Operation“.

Diagram of input circuit



NOTE!



Flow transmitter cables must not be routed near power lines or electromagnetic interference sources (min. 50 cm distance).

Flow transmitter with active signal on pulse input #1

- Connections: 10 and 11

Switch S3 * : ← S (ACT)

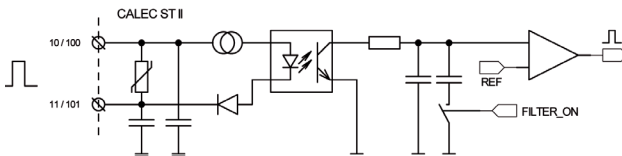
Switch S3 must be moved to the left-hand position (ACT) for flow transmitters with an active signal.

The pulse signal from the flow transmitter must comply with the following specifications:

Voltage range:	3...48 VDC	
Current signal:	> 2 mA	
Reverse polarity protection:	-48 V	
Electrical isolation:	48 V	
Frequency range:	0...20 Hz	0...200 Hz
Min. OFF (toff):	20 ms	2 ms
Min. ON (ton):	3 ms	300 µs

The programming options for this input are described in "InPutS" of chapter „Operation“.

Diagram of input circuit



NOTE!



Flow transmitter cables must not be routed near power lines or electromagnetic interference sources (min. 50 cm distance).

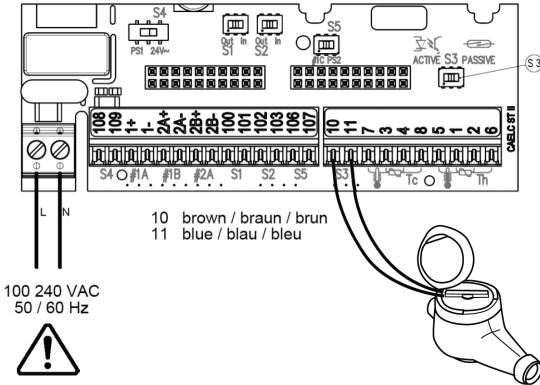
Connection examples for flow transmitters on pulse input #1

a) Connection example for TOPAS PMG/PMH flow transmitter

- Connections: 10 and 11

Switch S3 → S (PASSIVE)

The TOPAS PMH transmits a passive pulsed signal when switch S3 is in the right-hand position (PASSIVE).



b) Flow transmitter AMFLO® SONIC UFA113 with supply

- Connections: 10, 11 and 106, 107

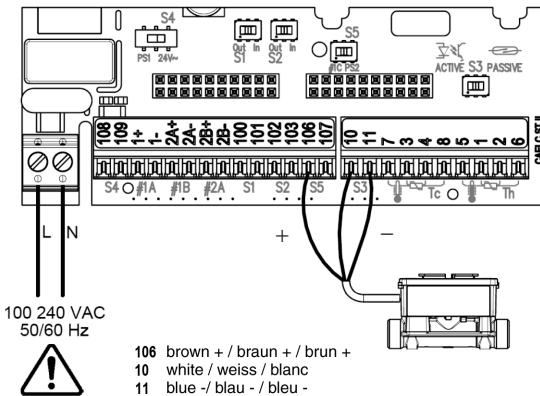
Switch S5 → S (PS2)

Switch S3 → S (PASSIVE)

The AMFLO® SONIC UFA113 is supplied with 3.3 V DC via terminal 106 and 107 when switch S5 is in the right-hand position (PS).

The AMFLO® SONIC UFA113 transmits a passive pulsed signal when switch S3 is in the right-hand position (PASSIVE).

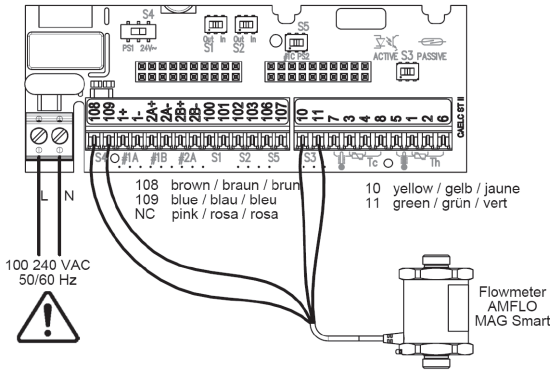
Connections 11 and 107 are connected internally, which means that the connection can be made using only 3 wires.



c) AMFLO® MAG Smart / MAG Basic flow transmitter with grounding (standard)

- Connections: 108, 109, 10 and 11

- Switch S4 * : ← S (PS1)
- Switch S3 → S (PASSIVE)



Set switch S4 to the left-hand position (PS) so that the AMFLO® MAG Smart is supplied with 24 V DC via terminals 108 and 109.

The AMFLO® MAG Smart transmits a passive pulsed signal when switch S3 is in the right-hand position (PASSIVE).

NOTE!

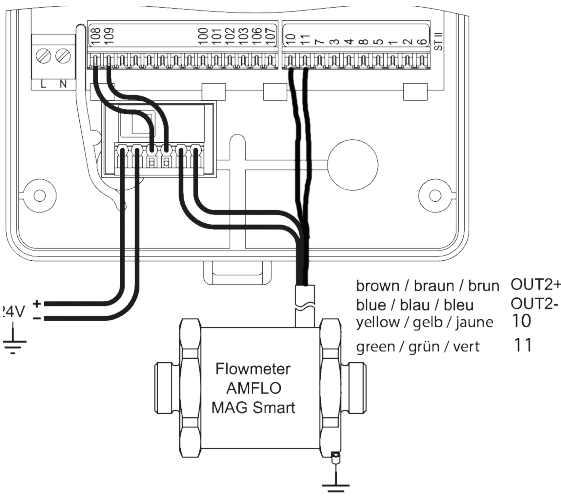


See note low voltage supply (page 13)

d) AMFLO® MAG Smart / MAG Basic flow transmitter with two groundings

- OUT2+, OUT2-, 10 and 11

- Switch S4 → S (=24V)
- Switch S3 → S (PASSIVE)



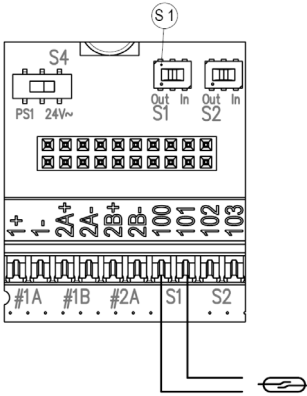
CALEC® ST II is supplied with 24 VDC via the adapter «insulated supply 24V-24V» (Art. no. 80828) IN+ and IN- over the clamps 108 and 109. Therefore the switch S4 needs to be switched to the “right” (24V).

AMFLO® MAG Smart is supplied with 24 VDC via OUT2+ and OUT2- at the adapter «insulated supply 24V-24V».

AMFLO® MAG Smart is emitting a passive pulse signal, for which the switch S3 shall be switched to the „right“ (PASSIVE).

Pulse input #2

- Connections: 100 and 101



Switch S1 → S \square (in)

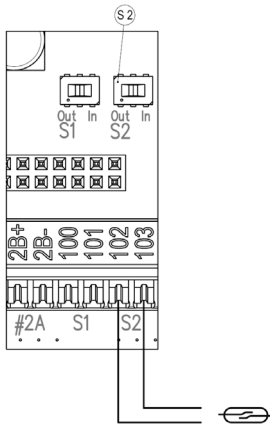
Terminals 100 and 101 can be used as the 2nd pulse input when switch S1 is set to the right-hand position (In).

The data correspond to pulse input 1 for passive pulse transmitters on terminal 10 and 11.

The programming options for this input are described in the “InPutS” of chapter „Operation“.

Pulse input #3

- Connections: 102 and 103



Switch S2 → S \square (in)

Terminals 102 and 103 can be used as the 3rd pulse input when switch S2 is set to the right-hand position (In).

The pulse signal from the pulsed transmitter must comply with the following specifications:

Frequency range: 0...20 Hz

t_{on} : $\geq 50 \mu s$

t_{off} : $\geq 50 \mu s$

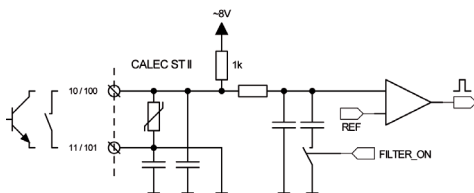
Switching thresholds:

R_{ON} : $\leq 20 \Omega$

R_{OFF} : $\geq 1 M\Omega$

The programming options for this input are described in the “InPutS” of chapter „Operation“.

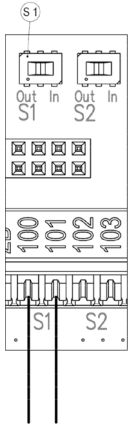
Diagram of input circuit



Digital output (pulse, status, alarm) #1

- Connections: 100 and 101

Switch S1 * : ← S1 (Out)

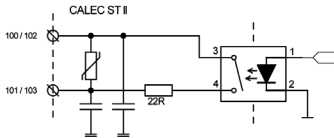


Terminals 100 and 101 are used as digital output 1 when switch S1 is set to the left-hand position (Out).

Switching voltage:	max. 48 V DC, 36 V AC
Switching current:	max. 100 mA
R _{ON} :	< 25 Ω
R _{OFF} :	> 1 MΩ
Electrical isolation:	max. 48 V DC
Pulse frequency:	max. 4 Hz
Pulse width:	100 ms

The programming options for this input are described in the “OutPutS” of chapter „Operation“.

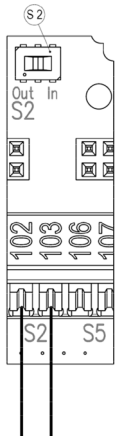
Diagram of input circuit



Digital output (pulse, status, alarm) #2

- Connections: 102 and 103

Switch S2 * : ← S2 (Out)



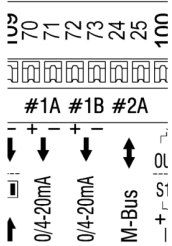
Terminals 102 and 103 are used as digital output 2 when switch S2 is set to the left-hand position (Out).

Data as per digital output signal 1.

Module slots

Connection diagram

CALEC® ST II is equipped with 2 separate slots for optional communication or function modules. Depending on the equipment fitted to the device, these 2 slots provide various connection options on outputs #1A, #1B and #2A. The connection diagram and the terminal numbers shows the optional communication or function modules which are fitted to the device.



Sample connection diagram:

Analogue outputs in socket #1 and M-Bus in socket #2.

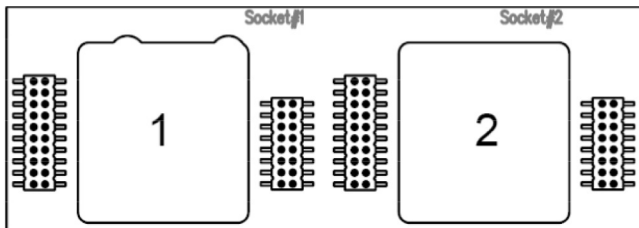
Function overview of outputs #1A, #1B and #2A

Function	Terminals	Available on output
M-Bus	24 - 25	#2A and / or #1A
Modbus RTU (RS 485)	90a - 91b	#2A and / or #1A
BACnet MS/TP (RS 485)	90a - 91b	#2A and / or #1A
N2Open (RS 485)	90a - 91b	#2A and / or #1A
LON TP/FT-10	90a - 97b	#2A and / or #1A
4 - 20 mA / 0 - 20 mA	70 - 71	#1A and / or #2A
4 - 20 mA / 0 - 20 mA	72 - 73	#1B

Optional communication and function modules

Communications modules can be connected to either slot #1 or #2.

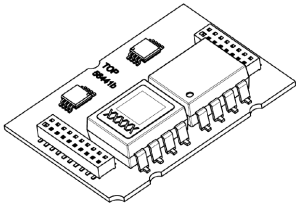
It is preferable to use the function module with 2 analogue outputs in slot #1, because both channels are connected to terminals. In principle, the analogue output can also be used in slot #2. However, only one analogue output is available on the terminals in this case. It is therefore preferable to use slot #2 for the first communication module.



Analogue module in socket #1

For devices with 2 analogue outputs, the analogue module is fitted to socket #1.

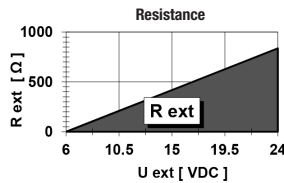
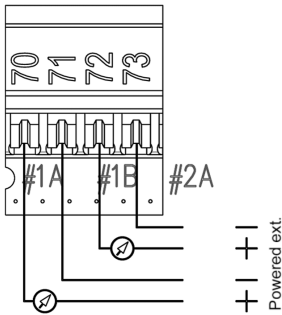
- Connections: 70, 71, 72 and 73



If an analogue module is connected to socket #1, there are 2 passive analogue outputs via terminals 70/71 (#1A) and 72/73 (#1B).

The analogue outputs are electrically isolated.

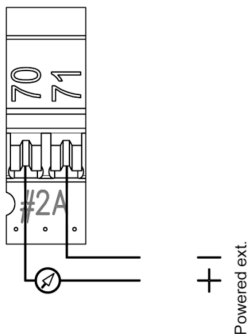
Current range:	4...20 mA or 0...20 mA
Supply voltage:	6...24 V DC
Electrical isolation:	max. 48 V DC
Resistance:	≤ 837 ohms at 24 V DC



The programming options for this output are described in "I-OUT" of chapter „Operation“.

Analogue module in socket #2

- Connections: 70 and 71 (#2A)



If an analogue module is connected to socket #2, there is one analogue output via terminals 70 and 71 (#2A).

Data as per the analogue module in socket #1.

M-Bus Modul

REFERENCE!



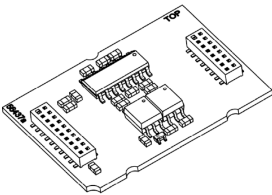
The M-Bus protocol is described in detail in a separate document, which is available on the following website:
<http://www.aquametro.ch/qr/prod/calec-st/11111.html>



M-Bus-Modul in Socket #2

Slot #2 is used for the first communication module.

- Connections: 24 and 25 (#2A)

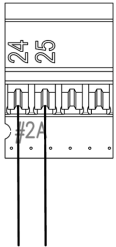


M-bus is connected via terminals 24 and 25 (#2A).
The primary and secondary address, and the baud rate, can be set under “M-BuS”.

The interface is electrically isolated.

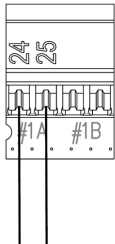
Factory settings:

Primary address:	0
Secondary address:	Serial number
Baud rate:	2,400 baud



M-Bus module in socket #1

- Connections: 24 and 25 (#1A)



The wiring for the second M-Bus interface is via terminals 24 and 25 (#1).

The specifications are the same as for the first M-Bus.

The settings for the first and second M-Bus can be programmed independently.

LON-Modul

REFERENCE!



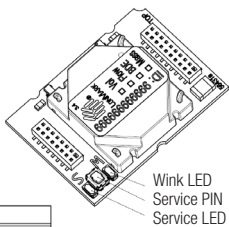
The LON TP-FT 10 interface is described in detail in a separate document, which is available on the following website:
<http://www.aquametro.ch/qr/prod/calec-st/11111.html>
An XIF file is also available at www.lonmark.org



LON module in socket #2

Slot #2 is used for the first communication module.

- Connections: 96a and 97b (#2A)

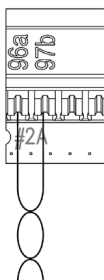


The twisted pair wiring is via terminals 96a and 97b (# 2A) and is not poled.

The interface is electrically isolated.

The service PIN and the Wink LED are available for identification on the LON network.

The service LED provides information about the system



Twisted - Pair

LON module in socket #1

- Connections: 96 and 97 (#1A)



Twisted - Pair

The twisted pair wiring for the second LON interface is via terminals 96a and 97b (#1A).

The specifications are the same as for the first LON interface.

BACnet MS/TP Modul

REFERENCE!



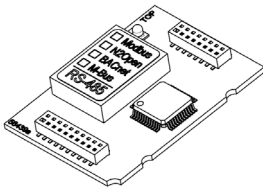
The BACnet MS/TP protocol is described in detail in a separate document, which is available on the following website:
<http://www.aquametro.ch/qr/prod/calec-st/11111.html>
The PICS document can also be found there.



BACnet MS/TP module in socket #2

Slot #2 is used for the first communication module.

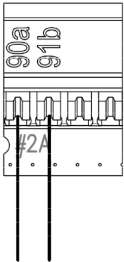
- Connections: 90a+ and 91B- (#2A)



The twisted pair wiring is via terminals 90a and 91b (#2A).

The BACnet MAC address, device instance number, mode and baud rate can all be set under "BACnet". If the CALEC® ST II is at the end of the BACnet-segment, the internal termination resistor can be used.

The interface is electrically isolated.



Factory settings:

Aquametro manufacturer ID: 431

BACnet device profile: B-ASC

BACnet MAC address: Last 2 digits of the serial number

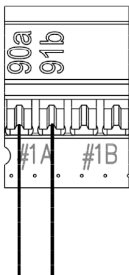
Device instance number: Last 5 digits of the serial number

Mode: Master

Baud rate: Automatic

BACnet MS/TP module in socket #1

- Connections: 90a+ and 91b- (#1A)



The twisted pair wiring for the second BACnet interface is via terminals 90a+ and 91b- (#1A).

The specifications correspond to the first BACnet interface.

Modbus RTU Modul

REFERENCE!



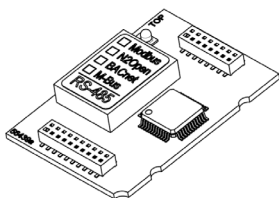
The Modbus RTU interface is described in detail in a separate document, which is available on the following website:
<http://www.aquametro.ch/qr/prod/calec-st/11111.html>



Modbus RTU module in socket #2

Slot #2 is used for the first communication module.

- Connections: 90a+ and 91b- (#2A)



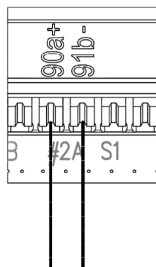
The twisted pair wiring is via terminals 90a+ and 91b- (#2A).

The address, baud rate and parity can be set under "ModbusS".
If the CALEC® ST II is at the end of the Modbus-segment, the internal termination resistor can be used.

The interface is electrically isolated.

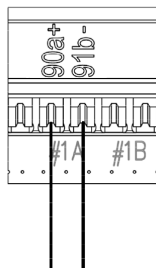
Factory settings:

Modbus address:	1
Baud rate:	19200 baud
Parity:	Even



Modbus RTU module in socket #1

- Connections: 90a+ and 91b- (#1A)



The twisted pair wiring for the second Modbus interface is via terminals 90a+ and 91b- (#1A).

The specifications are the same as for the first Modbus interface.

METASYS® N2Open Modul

REFERENCE!



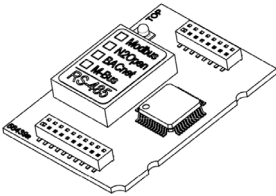
The METASYS® N2Open Interface is described in detail in a separate document, which is available on the following website:
<http://www.aquametro.ch/qr/prod/calec-st/11111.html>



METASYS® N2Open module in socket #2

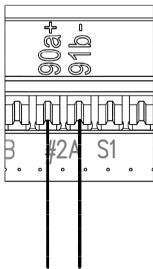
For devices with a communication module, this is fitted to socket #2.

- Connections: 90a+ and 91b- (#2A)



The twisted pair wiring is via terminals 90a and 91b (# 2A). The address and the baud rate can be set under “n2-buS”.
If the CALEC® ST II is at the end of the N2Open-segment, the internal termination resistor can be used.

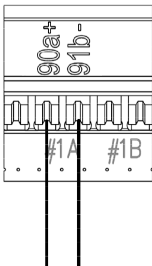
The interface is electrically isolated.



Factory settings:
N2Open address: 1
Baud rate: 9600

METASYS® N2Open module in socket #1

- Connections: 90a+ and 91b- (#1A)



The twisted pair wiring for the second N2Open interface is via terminals 90a+ and 91b- (#1A).

The specifications are the same as for the first N2Open interface.

Connecting the mains voltage

Hazard warning

WARNING!



Danger of electrocution!

Touching or gripping live electrical parts can cause an electric shock, which may result in burns, paralysis or death.

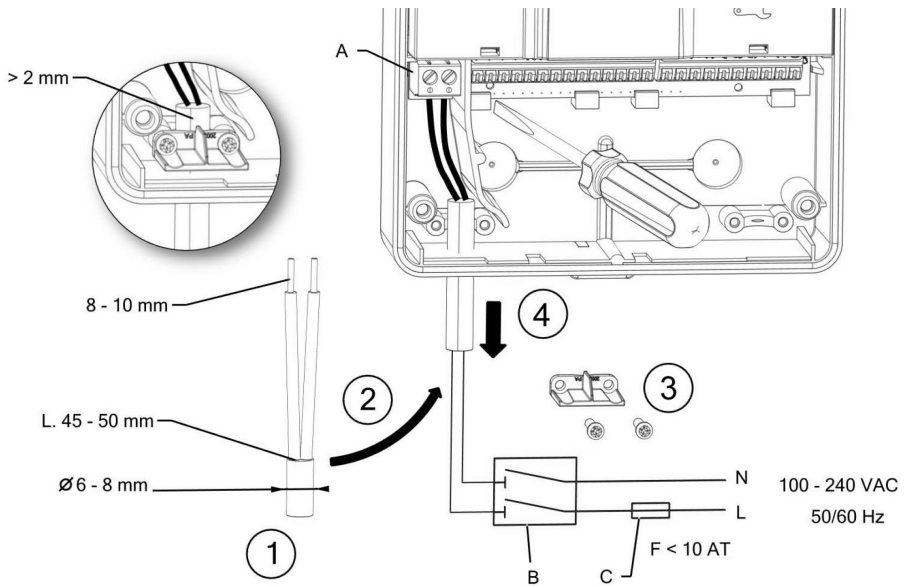
- The device should only be opened, installed or repaired when the power has been switched off.
- Only specialist technicians are authorised to work on or with mains voltage. They must comply with the applicable regulations.
- Only the screw-type terminals in the separated area on the left in the terminal compartment should be used to connect the device to the mains supply.

NOTE!



Calibrated device!

- The device must be protected by an external overcurrent protective device (max. 10A) so that the unit shuts down safely in the event of an electrical fault. The power supply must be designed to ensure that it has adequate protection against intentional interruption and that it can be shut down for maintenance.
- A marked 2-pole isolating device is mandatory. Alternatively, a 2-pole isolating overcurrent protective device can be used. However, it must not be possible to the circuit for the totaliser to be disconnected independently of the heating or cooling system.
- The connection cable must have a temperature resistance $> 65^{\circ}\text{C}$.



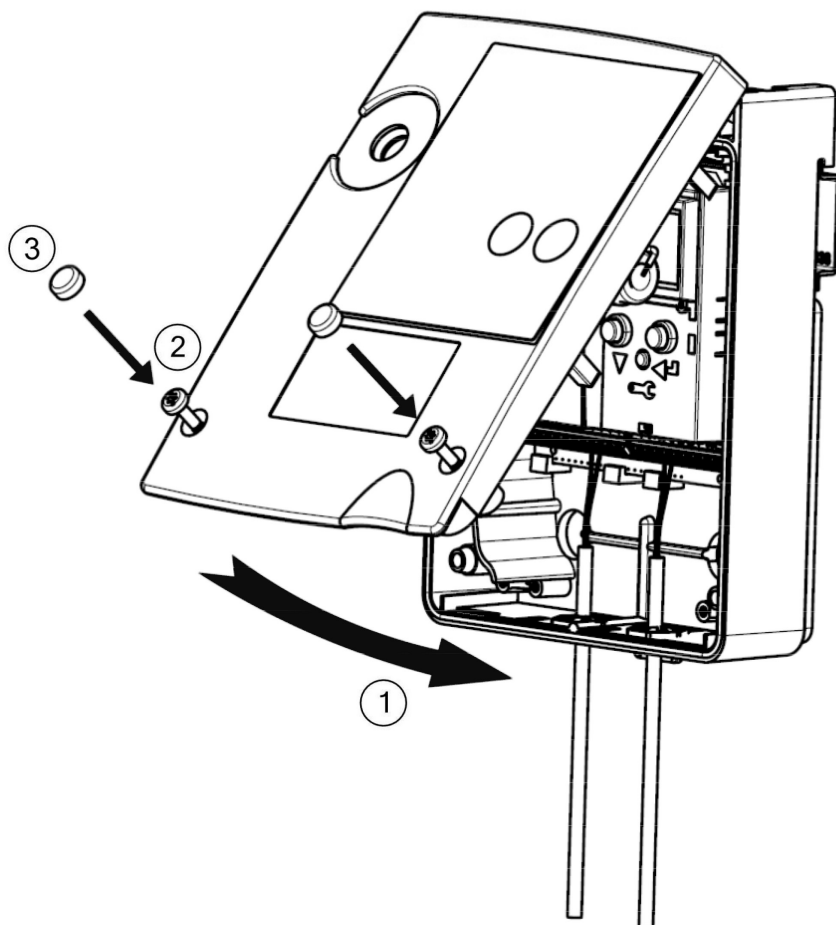
- (A) Power supply terminal
- (B) External isolating device
- (C) External protection

The power supply is connected to the screw terminals (A).
After tightening the terminals, check that the wires are clamped securely.

Tighten the strain relief, check that it is functioning correctly.

Closing the housing

- ① Insert the cover into the hinge from above and turn to close.
- ② Tighten the two fixing screws.
- ③ The screws can be secured. Once the security sealing caps stored on the top of the housing have been fitted, any unauthorised opening of the device can be detected. Engage the security sealing caps with the smooth side on the outside.



5 Controls and operation

5.1 Content of this manual

This manual only contains details of the operating steps required to perform a function check.

REFERENCE!

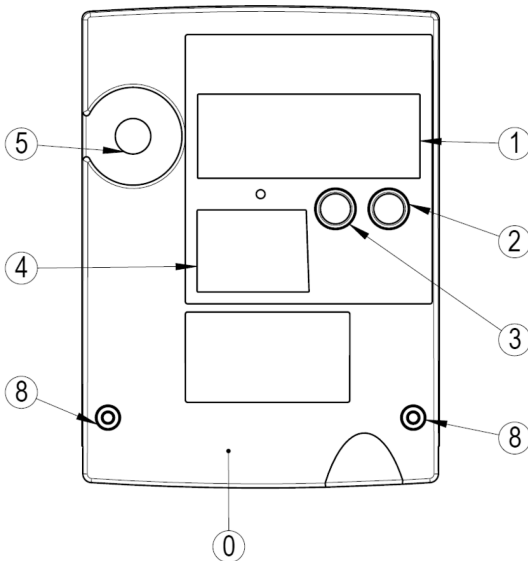


Related documents!

Related documents can be found on the following website:
<http://www.aquametro.ch/qr/prod/calec-st/11111.html>

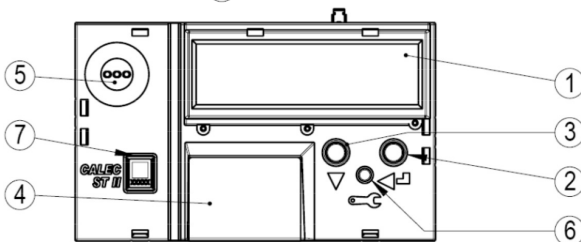


5.2 Controls

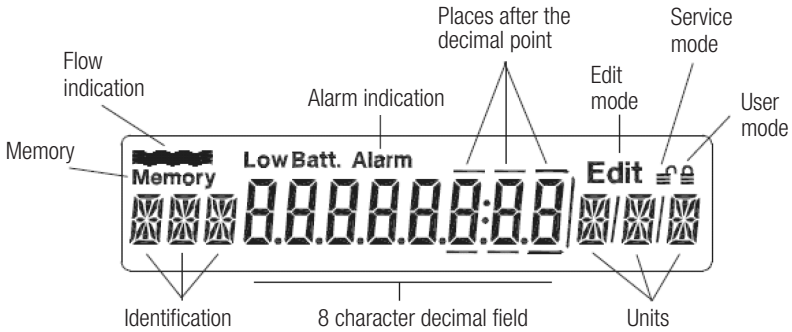


Cover

- ① **Liquid crystal display (LCD)**
- ① **Enter key**
- ② **Select key**
- ③ Nameplate, if verified with calibration
- ④ Optical M-Bus interface / alarm signal display (flashing red)
- ⑤ **Service key**
- ⑥ Nameplate of totaliser module
- ⑦ Housing screws covered by safety caps
- ⑧



5.3 Display



5.4 Operating modes

The operating keys and display enable all relevant settings to be carried out without using peripheral units. The settings are arranged in three security levels (lock levels).

Various data can therefore be altered depending on the operating mode.

User mode:

When the housing is closed, freely accessible data can be shown in the display using the keys.

Service mode:










This can be activated by pressing the service key when the cover is open. It also enables all necessary but non-verifiable startup parameters to be set and displayed.

Programming mode:

This enables the complete range of settings, including calibrated values, to be made.

This can be activated only if the leaded seal has been destroyed. It is not described in these instructions.

5.5 Key functions

Keys	Function
	Next field Higher value
	Accept the set value Accept the selected value
Hold  +  for longer than 1 s	Return to the standard “Counter” display
Hold  , press 	High-resolution display
Hold  , press 	Previous field Lower value
	The Service button activates Edit mode

When the device is switched on, the display shows the energy reading in the Counter loop. Additional readings can be displayed by pressing the Select button. The “Counter” menu is displayed once you have scrolled through all readings. Press the Enter button to display the Counter loop again. The other available main menus can be selected by pressing the Select button. Press the Enter button to display the relevant menu loop.

The main loop shows the key readings and allows you to navigate through the sub-loops. In addition, high-resolution meter readings can be displayed by pressing the two buttons simultaneously.

5.6 Display and menu structure

The following double pages shows the menu structure.

Legend:



Field visible



Field visible under certain conditions



grey 15%

Field in service mode
editable



grey 35%

Field in programming mode
editable



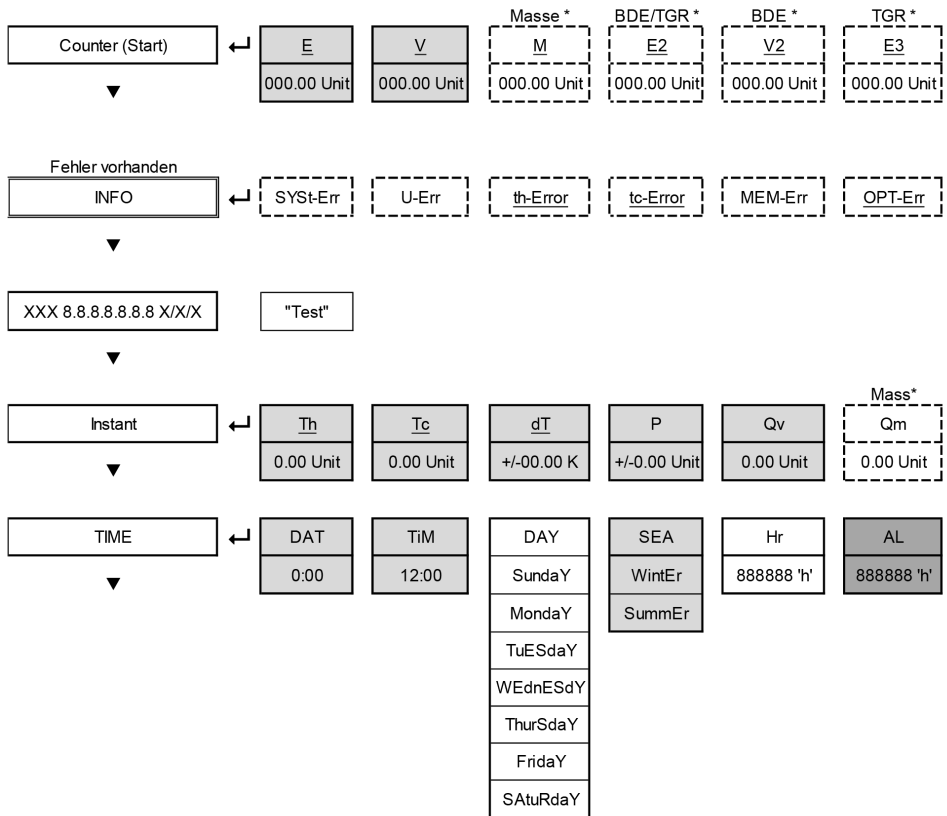
white

Field in Init mode
editable

Note!



Fields marked with * are only visible when the device has the corresponding option (Mass, PDA, TGR, tariff & BDV, Flow, GLY).



Menu description

Display Definition

Display	Definition
Counter	Counters
E	Energy meter reading
V	Volume meter reading
M	Mass meter reading (optional)
E2	Energy meter 2 reading (optional BDE/TGR)
V2	Volume meter 2 reading (optional BDE)
E3	Energy meter 3 reading (optional TGR)
H1	Auxiliary counter 1 reading (optional Flow)
H2	Auxiliary counter 2 reading
H3	Auxiliary counter 3 reading
Imp	Pulse value flowmeter
Sid	Installation side flowmeter

Display Definition

Display	Definition
INFO	Error messages
SYSt-Err	Error system
U-Err	Error supply
th-Error	Error temperature sensor hot side
tc-Error	Error temperature sensor cold side
MEM-Err	Memory error (HW)
OPT-Err	Error on one of the option modules (HW)
th-ALARm	Temperature on hot side outside the permitted range
tc-ALARm	Temperature on cold side outside the permitted range
dt-ALARm	Temperature difference outside the permitted range
Ext-AL	External Alarm

XX888XXX Display test

Flow*				
H1	H2	H3	Imp	Sid
0	0:00	0:00	000.00 Unit	hot
				cold

th-ALArM	tc-ALArM	dt-ALArM	EXt-AL
----------	----------	----------	--------

KF	DEN
0:00	0.00 Kg/l

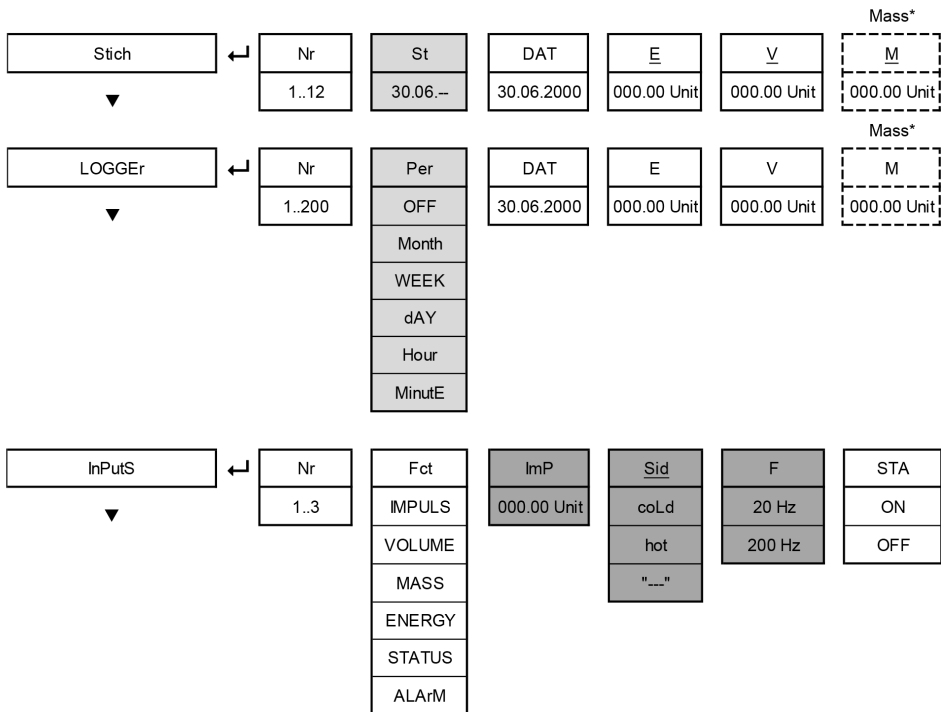
Err	Pb
888888 'h'	2012

Display **Definition**

Instant	Current values
Th	Temperature hot side (For cooling = Return line)
Tc	Temperature cold side (For cooling = Supply line)
dT	Temperature difference
P	Power
Qv	Flow
Qm	Mass flow
KF	Specific heat factor
DEN	Density

Display **Definition**

TIME	Time-parameters
DAT	Date
TiM	Time
DAY	Day
SEA	Summer or Winter time
Hr	Operating hours
AL	Hours of alarm
Err	Hours of error
Pb	Calibration year



Menu description

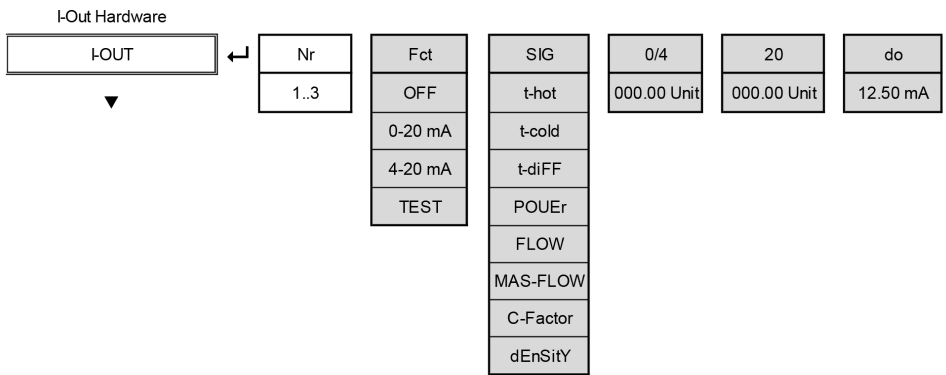
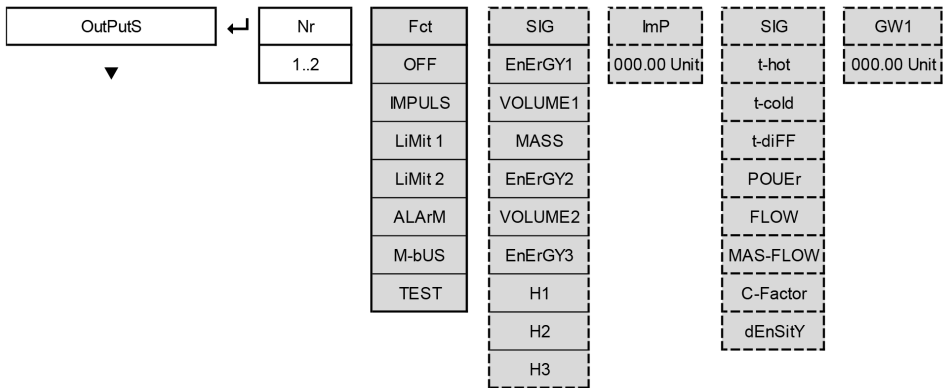
Display	Definition
Stich	Billing date values
Nr	Billing date number 1 - 12
St	Billing date 1 - 12
DAT	Date
E	Energy meter reading
V	Volume meter reading
M	Mass meter reading
E2	Energy meter reading 2, in options BDE / BDV
V2	Volume meter reading 2, in options BDE / BDV
E3	Energy meter reading 3, in option TGR
H1	Auxiliary meters reading 1, in option Flow
H2	Auxiliary meters reading 2
H3	Auxiliary meters reading 3
AL	Alarm hours
ERR	Error hours

Display	Definition
LOGGEr	Logger data
Nr	Logger number
Per	memory interval
DAT	Date
E	Energy meter reading
V	Volume meter reading
M	Mass meter reading
E2	Energy meter reading 2 in options BDE / BDV
V2	Volume meter reading 2 in options BDE / BDV
E3	Energy meter reading 3 in option TGR
H1	Auxiliary meters reading 1, in option Flow
H2	Auxiliary meters reading 2
H3	Auxiliary meters reading 3

BDE*	BDE*	TGR*	Flow*					
E2	V2	E3	H1	H2	H3	AL	Err	
000.00 Unit	000.00 Unit	000.00 Unit	0	00000000	00000000	888888 'h'	888888 'h'	
BDE*	BDE*	TGR*	Flow*					
E2	V2	E3	H1	H2	H3	Pm	AL	Err
000.00 Unit	000.00 Unit	000.00 Unit	0	00000000	00000000	+/-0.00 Unit	888888 'h'	888888 'h'

		TGR*
MAX	MiN	Tr
000.00 Unit	000.00 Unit	000.00 Unit

Display	Definition
Inputs	Parameters for input signals
Nr	Input number
Fct	Input Function
ImP	Puls value of the flow meter
Sid	Installation side of the flow meter (th = hot side, tc = cold side)
F	Maximum frequency
STA	Actual status
MAX	Upper limit for th / tc alarm
MiN	Lower limit for th / tc alarm
Tr	Threshold for return temperature in option TGR Overstepping: register E2 Undercutting: register E3



Menu description

Display Outputs	Definition
Nr	Parameters for digital output signals
Nr	Output number
Fct	Output Function
SIG	Type of the output
ImP	Pulse value of the output
GW1	Limit 1
GW2	Limit 2
Hys	Hysteresis
Cnt	Pulse counter / Seconds of overstepped limit value
Act	Direction of action
STA	Actual status

Display I-Out	Definition
Nr	Parameters for analogue output signals
Nr	Output number
Fct	Output Function
SIG	Type of the output
0/4	Value at 0 mA
20	Value at 20 mA
do	Simulation mA value
Err	Current output in case of error
STA	Current value

GW2	Hys	Cnt	Act	STA
000.00 Unit	0..10%	88888888	on	on
			off	off

Err	STA
cont	6.50 mA
HI Curr	
LO Curr	

UnitS ▼	Eu	Ed	V	M	P	Q
	kWh	0.001	0.001 - 1m3	0.001 - 1 t	0.001 W	0.001 L/S
	MWh	0.01	0.1 - 1 GAL		0.001 KW	0.001 L/m
	MJ	0.1			0.001 MW	0.001 L/h
	GJ	1			0.001 MJ/h	0.001 m3/h
	KBT				0.001 GJ/h	0.001 GA/h
	MBT				0.001 KB/h	
				0.001 MB/h		

M-BuS ▼	Nr	Adr	SEK	BAU	Acc	APP
	1..3	0..250	99999999	300	0..255	CANCEL
				2400		RESET
				9600		

RS-485 Hardware

ModbuS ▼	Nr	Adr	BAU	Par	TRN
	1..2	1..247	300	odd	OFF
			2400	NONE	ON
			9600	EVEN	
			19200		
			38400		

RS-485 Hardware

n2-buS ▼	Nr	Adr	TRN
	1..2	1..255	OFF
			ON

RS-485 Hardware

BAcnet ▼	Nr	Adr	Mod	DIN	TRN
	1..2	0..250	MAStEr	4194302	OFF
			Slave		ON

Menu description

Display UnitS	Definition
Units	Units
Eu	Energy unit
Ed	Number of decimal places on the display for energy
V	Number of decimal places on the display for volume
M	Number of decimal places on the display for mass
P	Power unit
Q	Volume flow unit
T	Temperature unit
EP	Pulse value for energy pulse output
VP	Pulse value for volume pulse output

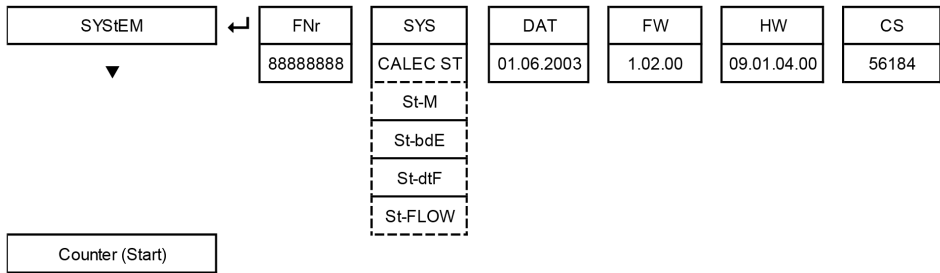
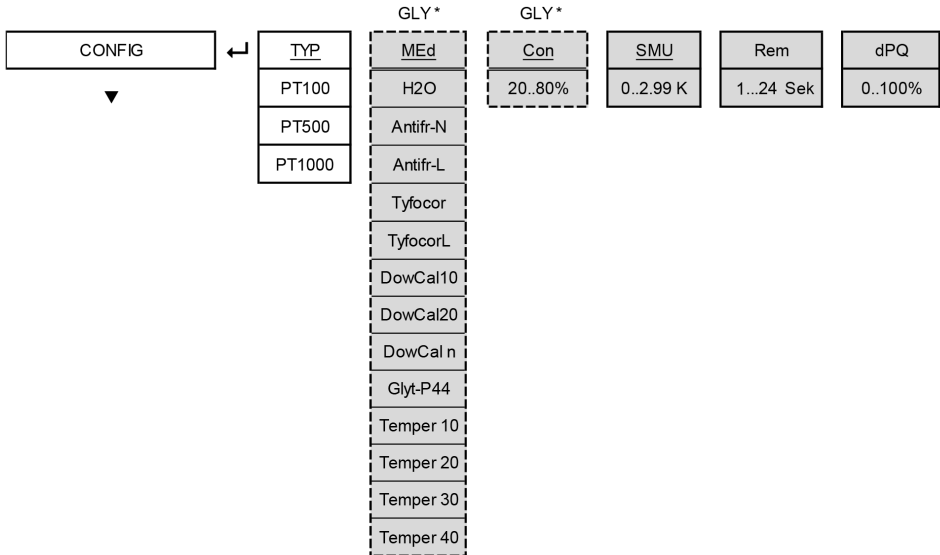
Display M-BuS	Definition
M-Bus parameters	M-Bus parameters
Nr	M-Bus number (1 = Socket #1, 2 = Socket #2, 3 = optical interface)
Adr	Primary M-Bus address
SEK	Secondary M-Bus address
BAU	Baud rate
Acc	Access counter
APP	M-Bus application reset

T	EP	VP
0.1 °C	0.001 Wh	0.001 mL
0.1 °F	0.001 KWh	0.001 L
	0.001 MJ	0.001 m3
	0.001 KBT	0.001 GAL

Display	Definition
Modbus	Modbus-Parameter
Nr	Modbus number (1 = Socket #1, 2 = Socket #2)
Adr	Modbus address
BAU	Baud rate
Par	Parity
TRN	Termination resistor ON / OFF

n2-buS	N2Open parameters
Nr	Number (1 = Socket #1, 2 = Socket #2)
Adr	Address
TRN	Termination resistor ON / OFF

Display	Definition
BACnet	BACnet-parameters
Nr	Number (1 = Socket #1, 2 = Socket #2)
Adr	Address
Mod	Mode (Master /Slave)
DIN	BACnet Device Instance Number
TRN	Termination resistor ON / OFF



Menu description

Display CONFIG

Display	Definition
TYP	Type temperature sensors (PT 100 etc.)
MEd	Heat carrier (medium) in option Glycol
Con	Concentration of heat carrier in option Glycol
SMU	Low flow cut off
Rem	Remanence (time of display of instantaneous Values)

Display CONFIG

Display	Definition
dPQ	Attenuation factor for power and flow
dPt	Attenuation factor for temperature
Loc	Lock levels
RES	Reset of alarms and counters (depending on lock level)
dt-	Adjustment of minimal temperature difference alarm
dtc	Sensor alignment

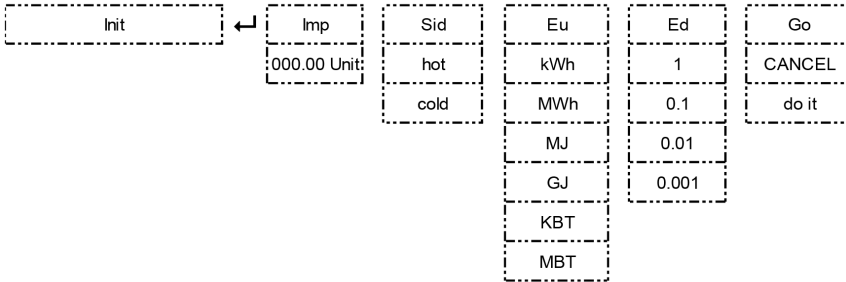
<u>dPt</u>	Loc	RES	<u>dt-</u>	<u>dtc</u>
0..100%	USER	CANCEL	-50 --1	CANCEL
	SERVICE	ALARM		rESEt
	PrOGrAM	CountEr		do it
	FACTORy	LOGGER		
		OPTiOn		

Display SYSTEM **Definition**

FNr	Fabrication number
SYS	Functionality of the calculator
DAT	Date of manufacture
FW	Firmware version
HW	Hardware version
CS	Checksum

NOTE!**Unit!**

If the option once-only on-site adjustment of the calibration-related input variables "IMP EBS" is used, ensure that the selected unit can display the amount of energy accumulated during the calibration period without counter overflow.

Init-Mode: Once-only on-site adjustment**Menu description****Display****Definition**

- INIT** Depending on the model it is possible to program in the „INIT-Mode“ Imp/Sid/Eu/Ed once-only
- Go** After conforming the settings they can't be changed any longer

5.7 Commissioning

Startup

- Check the electrical connections.
- Turn on the power supply.
- Any error/alarms which appear must be fixed, (see Info loop and error messages).
- Press the select button until the display shows "ImP", and check the pulse value of the flow transmitter.
- Press the select button until the display shows "Sid", and check the installation side of the flow transmitter.
- Following startup, close the housing and secure the screws with the protective plugs.
(Sealing of calibrated measuring points)
- Give this operation manual to the user or leave it with the device.

Function control

- Check the main input unit, or set it up for an auxiliary meter (see Units loop).
- Check the pulse value of the main input, or set it up for an auxiliary meter (see Input loop).
- Check and/or set the date and time (see Time loop).
- If there is a flow, the wave symbol flashes in the top left of the display.
- Check whether plausible instantaneous values are displayed during unit operation (see Instant loop).
- The display reset time (to zero) and the filter characteristics for the instantaneous values of Q and/or P can be set in the Config loop.

5.8 Error messages, alarms

If a fault occurs, the message "Alarm" will appear on the display above the number pad. The optical M-Bus interface also flashes red to indicate the alarm message.

The short message in the information loop gives details of the reason for the fault/alarm.

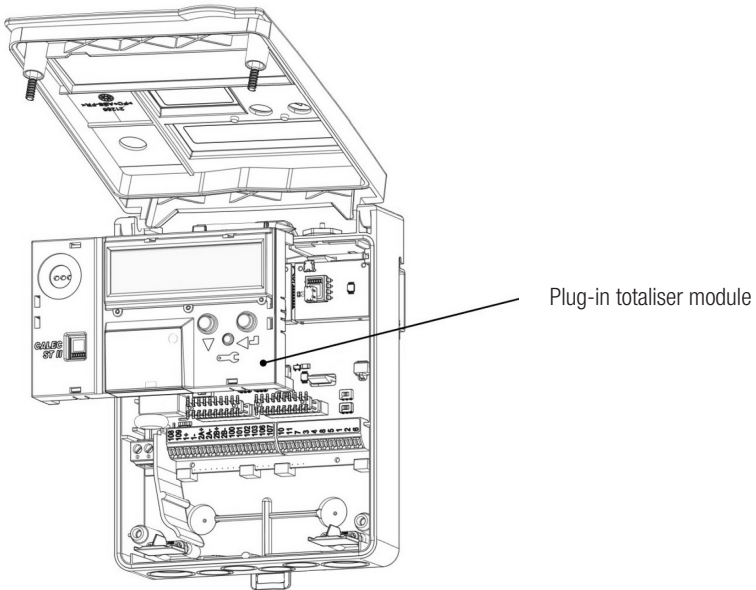
Message	Error/alarm	Possible cause	Corrective measures
th-ERROR	Temperature error on hot side, no measurement possible	<ul style="list-style-type: none"> • Sensor connected incorrectly • Interruption/short circuit in sensor cables 	<ul style="list-style-type: none"> • Check wiring • Check disconnected sensor wires with ohm meter • If OK, check the input input with a resistor: Pt 100: 100 - 150Ω Pt 500: 500 - 620Ω
tc-ERROR	Temperature error on cold side, no measurement possible	As above	As above
SYSt-Error	EEPROM memory error	Component/device error	Send the device to be checked
th-ALARm	Temperature on the hot side is outside the permitted measuring range	Temperature of the heat cycle is too high or too low	Check the current temperature in the InStAnt submenu
tc-ALARm	Temperature on the cold side is outside the permitted measuring range	As above	As above
dt-ALARm	Temperature difference is outside the permitted measuring range	<ul style="list-style-type: none"> • Temperature difference in the heat cycle is too large or is negative • Sensor problem 	Check the current temperature difference in the InStAnt submenu

6 Maintenance and repair

6.1 Recalibration

In accordance with national legislation on weights and measures, periodic recalibration is required for devices in commercial use which are subject to mandatory verification. The recalibration interval for energy meters is usually 5 years.

All calibration-related functions on the CALEC® ST II can be found on the plug-in totaliser module. This means that recalibration can be carried out by simply replacing the totaliser module. The lower section of the housing containing the field wiring does not have to be removed during calibration. The parameter settings specific to the device are stored redundantly in the lower section of the housing and are loaded automatically when a replacement totaliser module is plugged in. Reparametrisation of the device is not required. When processing the readings, however, remember to ensure that the readings on the replacement totaliser module are reset to 0.



7 Disposal



The device contains electronic components and must therefore be disposed of as electronic waste.

Aquametro takes back its old devices and will dispose of them. Please also note your local regulations in this respect.

8 Technical data

The following tables contain information on the technical data of the available functions. Please refer to the price list for possible combinations.

Standards	
CE directives	2004/22/EC Measuring Instruments Directive (MID)
	2004/108/EC Electromagnetic compatibility (EMC)
	2006/95/EC Low voltage (LVD)
	2003/108 Waste Electrical and Electronic Equipment (WEEE) Directive
Standards	EN 1434, EN 61000-6-1, EN 61000-6-2, EN 61010, DIN 43863-5

Housing and operating conditions	
Dimensions	W x H x D = 120 x 163 x 49 mm
Ambient temperature	+5...+55 °C, EN 1434 class C
Storage temperature	0...60 °C
Humidity	Max. 95% rel. humidity (non-condensing)
Operating altitude	Up to 2,000 m above sea level
Protection rating	IP 54
Terminals	1.5 mm ² spring terminals, Power connection 2.5 mm ² screw terminals

Basic data for calculator	
Temperature measuring range	0...+200 °C (heat carrier: water) -40...+180 °C (special heat carrier)
Temperature difference	0...190 K, Approval 3...190 K, on demand 2...190 K
Temperature sensor	Pt100 or Pt500 in accordance with IEC 751 paired in accordance with EN 1434, 2-wire or 4-wire connection. Max. sensor cable length 2-wire connection 10 m, 4-wire connection 15 m.
Temperature measurement resolution	20-bit resolution, typical ± 0.005 K ($T_a = 5...55$ °C)
Installation side	Hot or cold side
Pulse value of the flow sensor	0.001...9999.999 litres
Pulse values and units for auxiliary inputs and contact outputs	Volume: 0.001...9999.999 ml, l, m ³ , GAL Energy: 0.001...9999.999 Wh, kWh, MWh, MJ, KBTU
Error limits	Better than those required for calculators in accordance with EN 1434-1. Suitable for combined class 2 heat meters in accordance with EN 1434-1 when used with suitable volume metering units.
Optical interface	IEC 870-5, M-Bus protocol

Display	
Display units: volume	m ³ , USGal
Display units: energy	kWh, MWh, MJ, GJ, KBTU, MBTU
Data backup in the event of a power failure	In EERPOM >10 years
Data logger	500 values from all readings with a time stamp, stored in ring memory Logger interval: 1 min, 1 hour, 1 day, 1 week, 1 month

Additional functions	
Adjustable low flow cut-off (SMU)	Function for stopping the energy calculation when the temperature difference is too low, ΔT SMU adjustable $\Delta T = 0 - 2.99 \text{ K}$
Limit-value monitoring	One-sided or two-sided, hysteresis 0 - 10%, action of the output signal is selectable

Mains version	
Power supply	100 - 240 V AC, 50/60 Hz, max. 15 VA (in accordance with EN 1434) 12 - 42 VDC or 12 - 36 VAC, max. 1 VA (according to EN 1434) <i>At supply via adapter «insulated supply 24V-24V» (Art. no. 80828)</i> 24 VDC $\pm 20\%$, max. 7 Watt (at adapter)
Calculation cycle	1 s
Backup battery	3.6 V lithium battery

Low-voltage power supply for flow transmitter		
	Terminals 108 / 109 (depending on the version)	Terminals 106/ 107
Supply voltage	24 V DC, max.150 mA, el. isolation max. 48V V DC	3.6 VDC, max. 2 mA
Flow transmitter	e.g. AMFLO® MAG Smart or active sensors	e.g. AMFLO® SONIC UFA 113

Pulse inputs and outputs

Main input #1 (10/11)	Connecting a pulse generator according to NAMUR, with potential-free contact (reed relay) or SSR (solid state relay), or for active sensors with the following values.	
	Input passive	Input active
	Open-circuit voltage 8 V	Voltage range 3...48 V DC
	Short-circuit current 8 mA	Current signal > 2 mA
	Switching level <1.5 mA, >2.1 mA	Reverse polarity protection -48 V
	Min. OFF (t off) 20 Hz 20 ms	Electrical isolation 48 V
	Min. ON (t on) 20 Hz 3 ms	Min. OFF (t off) 20 Hz 20 ms
	Min. OFF (t off) 200 Hz 2 ms	Min. ON (t on) 20 Hz 3 ms
	Min. ON (t on) 200 Hz 300 µs	Min. OFF (t off) 200 Hz 2 ms
	Input capacity 20 nF	Min. ON (t on) 200 Hz 300 µs
Switchable input and output Output #1/ input #2 (100/101)	Input	Output
	Open-circuit voltage 8 V Max.	Contact rating 48 VDC, 100 mA
	Switching level <1.5 mA, >2.1 mA	Electrical isolation 48 V
	Min. OFF (t off) 20 Hz 20 ms	Contact resistance (on) <30 ohms
	Min. ON (t on) 20 Hz 3 ms	Contact resistance (off) >10 MΩhm
	Min. OFF (t off) 200 Hz 2 ms	Pulse frequency max. 4 Hz
	Min. ON (t on) 200 Hz 300 µs	Pulse width 100 ms
Input capacity 20 nF		
Switchable input and output Output #2/ input #3 (102/103)	Input	Output
	Open-circuit voltage 8 V	Contact rating 48 VDC, 100 mA
	Short-circuit current 800 µA	Electrical isolation 48 V
	Switching level <1.4, >3.2 kΩhm	Contact resistance (on) <30 ohms
	Pulse length t off : 20 ms	Contact resistance (off) >10 MΩhm
	Pulse length t on: 3 ms	Pulse frequency max. 4 Hz
	Max. frequency 20 Hz	Pulse width 100ms
	Input capacity 20 nF	

Option M-Bus	Factory settings
M-Bus Interface	in accordance with EN 13757-2/-3
Addresses	Primary address: 0 Secondary address: Serial number
Baud rate	2400 Baud

Option Modbus RTU	Factory settings
Physical layer and address	RS 485, / address: 1
Baud rate	19200
Address range (slave)	1...247
Parity	Even
Function code	03: Read holding register

Option LON Interface	Factory settings
Type	LON TP-FT 10 free topology (2-wire twisted pair), certified in accordance with LONMARK® 3.4
Baud rate	78 kBaud
Maximum bus length	500 m / 2700 m with/without termination resistors, 64 nodes per segment

Option BACnet MS/TP	Factory settings
Physical layer and AMT ID	RS 485 / ID: 431
BACnet device profile and instance	B - ASC / the last 5 digits of the serial number
BACnet MAC address	The last 2 digits of the serial number
Baud rate and mode	Automatic / master

Option N2Open	Factory settings
Physical layer and address	RS 485 / address: 1
Baud rate	9600

Option 2 analogue outputs	
Output signal	4...20 mA or 0...20 mA
Supply voltage	6...24 V DC
Electrical isolation	max. 48 V DC
Maximum resistance	≤ 837 ohms at 24 V DC, 0 ohms at 6 V
Maximum transformer error	0.15% of measured value + 0.15% of end value

9 CE Declaration of Conformity

REFERENCE!



CE Declaration of Conformity!

The CE Declaration of Conformity is available at:

<http://www.aquametro.ch/qr/prod/calec-st/11111.html>



**Konformitätserklärung
Declaration of conformity
Déclaration de conformité
Dichiarazione di conformità**



AQUAMETRO AG, Ringstrasse 75, CH-4106 Therwil

erklärt, dass das Produkt
declares that the product
déclare que le produit
dichiara che i prodotti

**Energie-Rechenwerk
Energy calculator
Calculateur d'énergie
Calcolatore d'energia**

CALEC® ST II

mit den Vorschriften folgender Richtlinien übereinstimmt :
conforms with the regulations of the following European Council Directives :
est conforme aux prescriptions et directives Européennes suivantes :
è conforme alle seguenti prescrizioni e direttive Europee :


CE-Konformität

Richtlinie Directive Directive Direttiva	CE	Beurteilungsverfahren Method of assessment Méthode d'évaluation Metodo di valutazione	Benannte Stelle Notified body Organisme notifié Organizzazione notificata
LVD 2014/35/EU Niederspannungsrichtlinie Low voltage directive Directive sur la tension basse Direttiva bassa tensione		Report: 13-EL-0323	Electrosuisse Luppenstr.1 CH – 8320 Fehraltorf
EMC 2014/30/EU EMV Richtlinie EMC directive Directive CEM Direttiva CEM		Report: E1903-06-14	QUINEL AG Grundstrasse 2 CH-6343 Rotkreuz
MID 2014/32/EU Messgeräterichtlinie Measurement Instruments Directive Directive sur les instruments de métrologie Strumenti di misura direttiva		Modul B: CH-MI004-14020 METAS, Bern-Wabern	Modul D: METAS-Cert 1259 Lindenweg 50 CH-3003 Bern-Wabern Modul F: N/A

Weitere Konformitäten

Richtlinie Directive Directive Direttiva	Beurteilungsverfahren Method of assessment Méthode d'évaluation Metodo di valutazione	Benannte Stelle Notified body Organisme notifié Organizzazione notificata
Mess- u. Eichverordnung : BGBl. I S. 2010	Bauartzulassung K7.2 PTB 22.75/14.01 PTB Berlin	Modul F: Regierungspräsidium Tübingen 0103 Ulmer Str. 227b D - 70327 Stuttgart

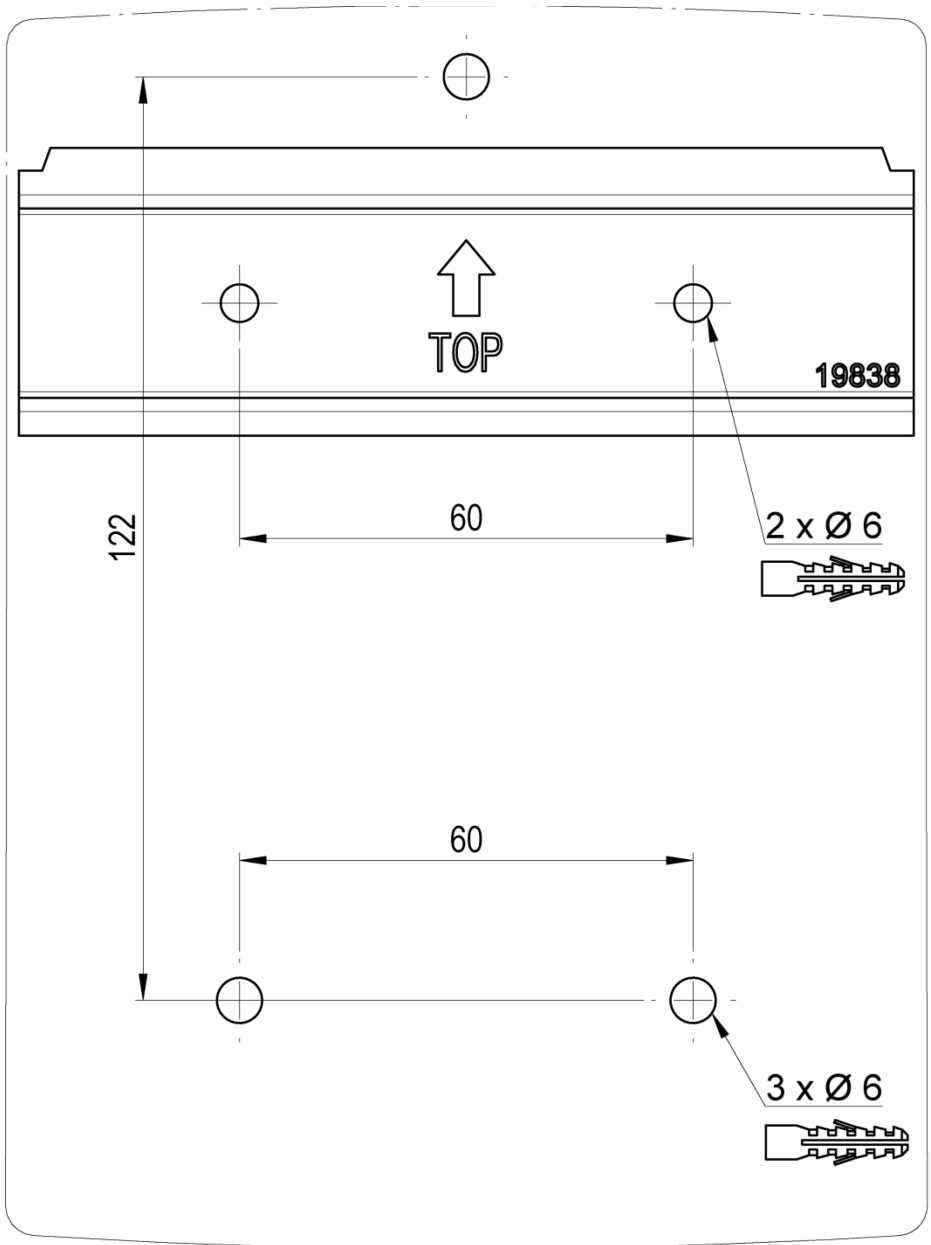
Therwil, 18.04.2016


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Thomas Bisang
Leiter Qualitätsmanagement
Head Quality Management
Responsable gestion de qualité
Direttore gestione qualità


.....
Franz Durmeier
Produkt Management
Product Management
Management des produits
Management del prodotto

10 Appendix

10.1 Hole template



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